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condenses at or near the surface of the dump-pile. Needle-shaped crystals, fully $\frac{2}{3}$ c. m. in length, have been seen.

2. Chalcopyrite (copper pyrites) occurs in perfect tetrahedral crystals, which are generally — though not always — adhering to zinc blende. They vary in size from 1 mm. to $\frac{2}{3}$ cm. in thickness. It is quite common in three or four shafts in the Short Creek lead mines, and a few specimens of it have been obtained from Joplin, Missouri, although its occurrence at Joplin is not mentioned by Prof. Leonhard in his "Notes on the Minerals of Missouri."

3. Greenockite (cadmium sulphide) has been found in a number of different shafts in the Short Creek mines, occurring as a yellow, or yellowish green, incrustation It gives to some brilliant sphalerite crystals a most beautiful appearance. No crystals have yet been found.

4. Anglesite (lead sulphate) is found adhering to galena. (*Rare.*)

PROTOZOAN REMAINS IN KANSAS CHALK.

BY PROF. G. E. PATRICK, OF THE STATE UNIVERSITY.

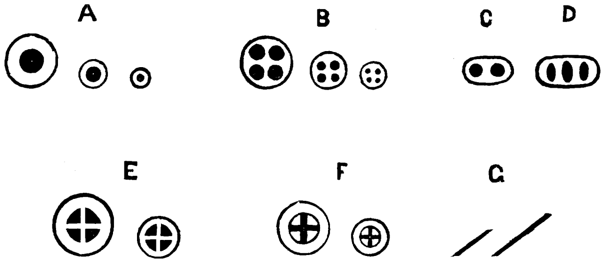
At the meeting of the Academy in 1875, I presented a paper upon "Kansas Chalk," then a recent discovery, and then first brought before the scientific world as the only known chalk in North America.

In that paper, after speaking of the chalk chemically and industrially, I stated that, with the highest microscopic power at my disposal, I had been unable to detect organic remains; and being of opinion that said power was sufficiently high for the purpose, favored the theory of chemical precipitation in accounting for the formation of this chalk. It has turned out, however, that a higher magnifying power alone was needed to render visible forms of undoubted organic origin. This was shown during last year (1882) by Mr. W. S. Bunn, a student at the University, and the possessor of a good microscope with an objective of much higher power than that previously used by myself.

Mr. Bunn made out two forms, one circular, the other rod-like, and *thought* he detected dark spots on some of the circular ones. He intended making further observations with a higher power than he then possessed; but being called away from the University, and having been since engaged in pursuits of a quite different character, he has given the subject no further attention, except to request me to report his observations to the Academy, together with any others that I might be able to make.

My own facilities for observation are no better now than when I originally examined the chalk; but through the kindness of Prof. E. A. Popenoe, I have had the use of an immersion lens of $\frac{1}{16}$-inch focal length, by means of which a few details were rendered visible which it may be worth while to describe here:

The circular forms (disks) observed by Mr. Bunn were found not all to be circular, part (a relatively small number) being decidedly oblong. The circular ones were marked with either one or four spots (figs. *a* and *b*); the oblong ones with two or three (figs. *c* and *d*). The single spot in a circular figure was itself apparently circular; the four spots in some appeared circular or roughly rounded (*b*), while in others they were plainly quadrants of a circle (*e*). From my working notes I take the following: "Circles light, spots black (as in *b* and *e*); changing the focus slightly, the spots become red; changing the focus still more, they become light, and the portion of circle between them becomes black, making dark cross on light ground" (as in *f*).



An expert microscopist could, I doubt not, interpret these appearances, and draw from them accurate and complete conclusions regarding the structure of the objects. This I freely confess I cannot do. However, I infer — more from appearances under a lower power than from these — that the dark spots are either actual holes, or else consist of a very transparent medium. The red color developed in the spots at a certain position may have been caused by either absorption or refraction, and may perhaps be accounted for by the conditions of observation. The objects and objective were both immersed in glycerine, and the light was from an argand gas-burner. With natural light, I do not remember having seen the red color.

The spots on the oblong figures were either circular (*c*) or oblong (*d*); when there were three, they were oblong in every case I observed.

No details could be made out upon the rod-shaped forms; they were simply rods (*g*) of different lengths, and comparatively rare.

With a stage micrometer I made approximate measurements. The circular and oblong forms varied much in size — a fact evident at first glance without a micrometer. The very largest were about $\frac{1}{2000}$ inch in diameter, many had a diameter of about $\frac{1}{3000}$ inch, and many of no more than one-half (possibly as low as one-third) this figure. The rods were in length one to three times the diameters of the larger disks.

The figures in the cut give an idea of the *relative* sizes of the objects described; they are of two or three times the *apparent* diameter with the one-sixteenth objective employed.

The perfect forms here described were somewhat rare, fragments and shapeless masses constituting the greater part of the material examined.